SOUTH LANARKSHIRE COUNCIL GEODIVERSITY AUDIT REPORT

SITE NAME: **Calderglen Country Park**

Location	East Kilbride
Grid Ref	648 515 to 665 565
Description	Deep wooded glen with cliffs and waterfalls
Current Use	Country Park
Designation	SSSI, Geological Conservation Review Site, Country Park
Access	Good overall, Country Park trails. But poor down to some exposures in river bed and banks
Year Visited	2018 - 2019

GEOLOGY

Age	Upper Carboniferous
Formation	Limestone Coal Formation Lower Limestone Formation Lawmuir Formation
Position	From Basket Shell Bed up to Crutherland Coals
Rock Types	Sandstone, mudstone, coal, limestone, ironstone
Description	Calderglen is a deeply incised glen with cliffs, gorges, waterfalls and incised meander. Thick sandstone beds dominate and they form the dramatic landscape of the glen. Intervening mudstones are largely hidden under gentler vegetated slopes. The strata are mostly fairly horizontal and mainly belong to the Limestone Coal Formation and Lower Limestone Formation but the Lawmuir Formation is exposed at the North end of the glen. The glen cuts across a broad east-west syncline with a number of roughly east-west trending minor faults. Economic deposits of coal and limestone brought the industrial revolution to the glen. The Crutherston Coals, comprising Smithy Coal, Jaunt Coal and House Coal (Lesmahagow Main Gas Coal horizon) outcropped extensively along the glen. We saw a fair bit of mining evidence including shafts and adits but no actual coal (all gone!). Economic deposits of limestone were exploited by the Calderwood Cement Works. The Hosie limestones (Calderwood Cement) were mined and kilned in the central part of the glen. We saw draw and clamp kilns and likely outcrop workings. Much of the limestone has been removed but we located exposures of the Hosie and Hurlet limestones in side glens. We found fossil brachiopods, ostracods, corals, lingula, crinoids and trees but generally only in the thin limestone beds, and some in ironstone and shale. With so many waterfalls, the river provided abundant water power for the mills, including Newhousemill. The dramatic scenery of the glen, caused by the deep post glacial downcutting of the river through resistant sandstones, led to its use for private estates and, now, a public Country Park. Detailed exposure descriptions are given in the Appendix.

ASSESSMENT

Main interest	Gorge and waterfalls, sandstone cliffs, good exposures through Lawmuir, Lower Limestone and Limestone Coal formations.
Heritage	Coal and limestone mining, lime works, estates.
Threats	None known
Public Use	This is a very popular Country Park
Importance	Regional

RECOMMENDATIONS

1. Extend the SSSI to include the valley sides as well as the valley bottom. This will bring into the SSSI many exposures on the valley sides that are not currently included.

2. Interpretation: include geology and mining heritage information on public information boards, leaflets and websites.

REFERENCES

BGS memoir, geology of the Hamilton District
BGS map, sheet 23 Hamilton
BGS unpublished field maps
Geological Conservation Review pp 81-84
River Calder, South Lanarkshire (NS 658 547-666 563)
South Lanarkshire Council, Calderglen C.P. leaflets.

Note on geological site assessments

Twelve visits, each about three hours duration, were made to the area between 15.1.2018 and 12.6.2019.

The visits were made by retired geologists Mike Browne, whose career was with the BGS, and Paul Carter whose career was with engineering consultants.

Exposure notes for each visit are given in the Appendix.

APPENDIX

Calderglen Country Park and environs.
EXPOSURE DESCRIPTION
Listed in chronological order
Note: all heights, thicknesses and lengths are estimates.

15.1.2018 Downstream from Visitor Centre,on west (left) bank.

1.'Horseshoe Falls'
This is a curved manmade weir. Small exposure of mudstone seen in river bed. Alluvial terrace downstream on west bank.

2. Torrance Linn. 6550 5303
This is a real natural waterfall about 3m high. Hard SANDSTONE layers form double waterfall with river thundering over. Seen from west bank. Strong, medium bedded, moderately vertical jointed, brownish grey, horizontal. Map shows old mine on east bank.

3. East bank cliffs 6550 5313
Same sandstone as Torrance Linn. About 5m high. Top 3m medium bedded, horizontal, strong SANDSTONE, bottom 2m very thinly bedded sandstone /SILTSTONE.

4. Old Quarry 6544 5311
In same SANDSTONE as 3. Fine to medium whitish grey, weathered brown, rooty sandstone. Small exposure. Weir across river.

5. Newhousemill Bridge 6549 5339
SANDSTONE, massive looking 2 to 3m orange yellow, forming mini-cliff. Just downstream is 5m high SANDSTONE cliff with smooth vertical joint face over 3m high.

6. Exposure 6555 5349
Massive SANDSTONE exposure continues downstream running right across river up to 4 to 5m thick. Dip east about 10^0. Old quarry on east bank and map shows old pit.

7. Stepped Path 6543 5359
At this point the path leaves the river side and continues downstream by climbing up steps to the bank top. Exposure 2m high, medium bedded SANDSTONE overlying shaly SILTSTONE, dip about 5^0 north.

8. Old Quarry Face? 6540 5360
1-5m thin bedded SANDSTONE
0.5m grey SILTSTONE
1.5m obscured by debris
Continues north for around 30m. Cavity found, old adit? probed to 1.5m

16.2.2018 Upstream from Visitor Centre
On east (right) bank to South Bridge then west bank to Flatt Bridge.

1. High Cliff 6559 5248
Dramatic 8m high cliff on east bank, SANDSTONE, yellowish, thick to thin bedded, with rock falls and drill holes, horizontal, cross bedding, joints subvertical 20^0 and 100^0 strike.
3m thick bedded
2m medium bedded
3m thick bedded
Small waterfall coming over from side gully. Just upstream there are sandstone exposures on west bank, forming a gorge. Main exposure about 100m long.

2. Another High Cliff 6560 5239

Another 8m high cliff on east bank in same strata as exposure 1. SANDSTONE with some mudstone in central flaggy section. Medium to coarse grained, open joints strike 70^0, contains flakes of mudstone, 5cm length of black fossil wood. Exposure about 50m long. Big recent rockfalls with fallen blocks up to 2m long. Drill holes visible, presumably from bringing down loose blocks. Some overhangs due to falls. Below the path, down to river level, another 2 to 3m of horizontal sandstone was seen. Total gorge depth about 20m.

3. South Bridge 6568 5227

Another 3m high 70m long SANDSTONE exposure above path with a further 3m thickness medium to thick bedded sandstone at river level.

4. Rotten Burn

The sandstone cliffs continue south on the east bank round into the Rotten Burn for about 70m length and up to 6m high. This is the 10-12m thick sandstone below the Crutherland Coals.

5. South Bridge West Bank 6565 5216

Now crossed over bridge to west (left) bank. SANDSTONE, 3 to 5m high exposures showing good cross bedding, oversteepening shows soft sediment deformation.

6. West Bank Path 6536 5191

Looking down from high level path can see 2 -5m exposure grey mudstone?, and ironstone bed and bullions in 1.5m high exposure. Approximate position Johnston Shell Bed.

7. Downstream Old Flatt Bridge

River going very fast over a series of low flat SANDSTONE waterfalls. MUDSTONE exposure in east bank about 1.5m high with a bright ochre iron stain running down the face. Below Johnston Shell Bed.

8. Old Flatt Bridge

Sturdy single arch bridge over river made from sandstone masonry, with small side arches for path and flood flows. Heavy timber buttresses.

9. Between Bridges

Horizontal SANDSTONE mini cliff up to 3m high showing cross bedding.

10. New Flatt Bridge

Masonry faced armco bridge for new line of A725 Strathaven Road. Upstream the river is now completely out of the deep Calderglen gorge, meandering through gently undulating ground.

11. Side Stream near South Bridge 6559 5229

Seen on return walk downstream from South Bridge on west bank. Extensive SANDSTONE exposures forming cliffs up to 3m high, up to 6m thickness of sandstone seen.

<u>12.3.2018 Downstream from Newhousemill Bridge</u>

Downstream on west bank to Black Linn.

1. Cliffs 6540 5380

River going round very tight bends, incised meanders. Approx. 5m high cliff on west bank, very overgrown, massive SANDSTONE. Low 0.3m high fall across river. Calderglen Mine is shown on map by path but nothing seen. A little downstream round another steep bend, another 5m high cliff on west bank, heavily overgrown, probably sandstone but could not see clearly, let alone examine.

2. Landslip

A small landslip in the valley-side hill wash material has cut across the glen path, showing geological processes still at work, albeit at small scale.

3. Calderglen Mines? 6561 5389 and 6565 5395
   A depression, next to manmade exposures - possible mine entrance, plus drains under path, may mark old mine site. Exposure shows 2m of medium bedded horizontal SANDSTONE with shaly partings, overlying 1m of mudstone/siltstone.

4. Exposures 6566 5390
   Still on path at top of slope. Thick bedded SANDSTONE 2m thick, on bluff on corner of sharp left river bank. Path junction, we now headed down to river level.

5. Exposure 6569 5389
   On east side, 3m high cliffs medium to thin bedded SANDSTONE, continues for 60m along river bed downstream to Trough Linn.

6. Trough Linn 6574 5399
   River thunders over a 3m high very narrow fall over massive SANDSTONE, situated below the strata in location 5. Downstream the river continues in a gorge (trough) up to 4 to 5m in height, formed in the same SANDSTONE as Trough Linn. This gorge continues most of the way to Black Linn.

7. Adit? 6576 5412
   Small entrance seen sloping steeply west into foot of bank just left (west) of path. Probed to length of 2.5m with no resistance, but could not find larger branch! Shaly sandstone roof, lots of collapse so only just seen.

8. Black Linn
   Very impressive waterfall, much wider than Trough Linn and falling 4 to 5m over massive SANDSTONE, vertically with overhangs. Two lower falls below, river widens below to deep pool. Sandstone cliffs downstream.

And so we wearily returned, all waterfalled and sandstoned out.

<u>Old Mine Workings and Limekilns</u>
<u>9.4.2018 West bank from Inchkeith entrance.</u>

1. Old Channels 6592 5445
   Two channels about 3 to 4m wide and 1m deep heading diagonally north downslope from top of bank. One “channel” maybe old outcrop workings, other “channel” slightly to north appears to have been a well graded access track to bottom of glen.

2. Linear old working 6590 5450
   An apparent old working runs along the contour, a continuation of the first channel described in location 1. It is located just a few metres elevation above the river and consists of a long excavation into the hillside with a spoil ridge on the downside slope. Could also have underground galleries going in from this.

3. Old Draw Kiln 6590 5450
   Masonry arch draw kiln, can see just 1 to 2m inside then infilled. Arch appears about 2.5 to 3.0m wide. About 2m above the arch there is a deep 2m wide hollow, probably the feed shaft for the kiln.

4. Exposure 6591 5454
   MUDSTONE in river bank about 1.5m high, also in river bed. Boulders of hard grey limestone in shingle bank.

5. Exposure 6595 5444
   In opposite (east) bank there is a 0.3m thick hard band, possibly limestone?, stands out well, gentle dip upstream. On west bank loose mudstone with two benches and shallow trenches behind. Possible old workings.

6. Exposure 6594 5440
A little further upstream from 5, there appears to be another hard band, possibly limestone, in far (east) bank with 4 to 5m of mainly mudstone above. Above this is about 5m of thick sandstone.

7. Upstream Limit 'humps and hollows' 6590 5434
Valley side has now closed in, apparent limit of workings. Mines appear to have worked out all limestone on our west bank and from river bed.

8. Clamp Kilns. 6m north of draw kiln.
Two U shaped clamp kilns about 3m wide and long and 1 to 1.5m deep, with possible evidence of a third.

9. Tight River Bend 6588 5456
In opposite (east) bank 0.3 to 0.4m hard band (limestone?) with about 2m mudstone above then another 0.5m hard band. Our side, all gone, so nothing to see. Rotten Calder – rotten miners, leaving us with nothing to see.

10. Downstream Limit 'humps and hollows' 6584 5460
Sharp right hand bend in river and west bank closes in becoming a very steep bank with black MUDSTONE and SANDSTONE exposures. Boulders of limestone in river, yellow weathering medium grey very hard with lots of small crinoid fragments. River in 30m deep gorge, another classic incised meander.

13.6.2018 Inchkeith Entrance to site of Calderwood Castle West Bank

1. Exposure 6592 5470
MUDSTONE exposed in east bank, about 3m high by 30m long.

2. Tributary Burn
About 0.1m very hard fine grained IRONSTONE in paper shale.

3. Waterfall 6605 5489
SANDSTONE about 1.5m medium bedded ripple marked light brown, with 1.0m thin bedded SAND/SILTSTONE above.

4. Exposure 6597 5487
LIMESTONE , 0.3m sandy limestone with crinoids.

5. Exposure 6593 5486
Just upstream from location 4. LIMESTONE, 1m hard dark grey crinoidal with solution widened joints, exposed on west bank at river level.

6. Waterfall 6607 5498
About 3m mainly thick bedded SANDSTONE overlying 1m obscured material – probably shales, forming 1m high waterfall.

7. Castle Fall
Impressive 4 to 5m high fall. River cascades down steeply sloping front face on 1.5m bed hard thick SANDSTONE with thin bedded sandstone – MUDSTONE below.

8. Site of Calderwood Castle
Some evidence of ruined buildings at river level, difficult to access.

9. Old Shafts?
Seen on return, beside top path above Castle Falls. Two circular depressions 3 to 4m in diameter.

9.7.2018 Calderglen North End

Explored upstream from Caldergrove entrance. Able to access both banks of river as water levels low.

1. Exposure approx. 662 554
   Deep steep wooded valley with access down to drain outlet. Flaggy ripple marked SANDSTONE in river bed. High up on east side, thick bedded SANDSTONE forms 6m high cliff.

2. Fault approx. 662 555
   On right hand bend , on west side
   1.5m whitish fault gouge. A melange of sandy and limy fragmented material. Some fizzed when treated with dilute hydrochloric acid.
   1.5m fine micaceous very hard SANDSTONE, medium bedded, dip 20^0 south.
   1.5m mudstone? – could not access
   On right (east) bank is a terrace about 3 to 4m above river.

3. Exposure approx. 663 556
   Ironstone, very hard dark grey with productids, corals and crinoids, 0.3m, dip 20^0 south, did not react with acid.

4. Exposure 6641 5563, first available GPS grid ref.
   Loose blocks flaggy sandstone in east bank. Cliff about 5m high in massive sandstone near top.

5. Old Workings 6633 5568
   Followed likely old workings diagonally up bank, Hurlet?

Notes.
Locations 2-4.River Terrace. At east side below steep slope and cliff there is a depression and gully looking man made – old adit?

Locations 4-5. West bank half way up slope, signs of old track and possible adit.

30.7.2018 Calderglen North End East Bank

Explored upstream from A725 culvert.

1. Side gully beside A725 culvert. Approx. 6m of hard, white weathering fawn, medium grained SANDSTONE, sparks when hit. Mushy weathered fine sandstone at river level. Looking north through culvert can see impressive sandstone cliff face on east bank.

2. Mine Entrance.
   About 30m south of sharp kink in lane, no GPS signal. Mine entrance 2m wide and 0.6m depth. Sandstone visible in roof, dipping to south east (160^0). Probably "Basket Day Hole".

3. Old Track 6648 5606
   Followed 'barely there' old estate track on east bank near top of slope, deep in very tall mixed woods. Then down to river and another 100- 200m scramble upstream. No exposures. Small alluvial terrace on east bank. Did not find hoped for crinoidal limestones.

18.2.2019 Downstream from Calderwood Gardens to A725 West Bank.

1. Pipe Bridge. Upstream from A725 – no GPS available.
   5.0m hard light brown medium bedded SANDSTONE
   0.7m mottled light grey and reddish brown soft to firm CLAYROCK. (Took some to use with primary schools).
   Dip about 15^0 upstream into fault
   Lawmuir Formation.

2. Shell Bed Exposure 66495 56127

2.0m poorly exposed SANDSTONE crag
1.0m black fissile MUDSTONE
0.15m LIMESTONE, brown weathering fine grained nodular shelly grey, lingula
0.15m MUDSTONE fissile
0.3m BASKET SHELL BED, hard grey fine grained calcareous sandstone with lingula
0.6m CLAYROCK grey
0.15m CLAYROCK mottled red brown grey orange
0.5m SILTSTONE mottled grey and brown friable
0.5 SANDSTONE, hard, light brown
RIVER surface

These exposures were very difficult to access, swinging from tree to tree, down very steep slopes, not so advisable at our age. However, worth it for our only view of Lawmuir Formation in the Country Park, and for relocating the BASKET SHELL BED, an important Carboniferous marker band.

<u>18.3.2019 East Bank near site of Craigneath Castle.</u>

1. Fiddlers Burn – Upper Falls 6639 5504
   Waterfall on side burn at top of Calder gorge.
   4.0m SANDSTONE cliff. Medium to thick bedded, cross bedding.
   2.0m MUDSTONE
   0.5m LIMESTONE, hard grey fine grained MID HOSIE
   0.5m MUDSTONE
   0.5m LIMESTONE, hard grey fine grained MAIN HOSIE
   2.0m SANDSTONE thin bedded
   0.5m grey shaly sandstone
   2.0m SANDSTONE thin bedded, worm burrows, ripple marks
   The upper 6.0m of this section form a cliff and 6m vertical waterfall. The lower 6.0m form a series of rapids and small falls.

2. Fiddlers Falls 6630 5510
   Very steeply sloping gorge plunging down east side of Calder Glen, below exposure 1. Drops around 20m through medium to thick bedded SANDSTONES in series of falls and chutes. Old masonry bridge abutment, remains of old estate road.

3. Fiddler Burn above Falls
   Now on gentle slope above falls and steep valley side. Small old black shale spoil heaps, possible TOP HOSIE workings?

4. Exposure 6642 5508
   Scarp of pinkish coarse SANDSTONE with small 1m wide entrance, possible old mine or quarry workings.

5. Old Quarry 6646 5512
   Small old quarry along strike from location 4, 2m thick bedded hard SANDSTONE, coarse grained grey containing small quartz pebbles.

<u>15.4.2019 East Bank near Basket Farm</u>

1. Old Quarry and ‘Pictish Carvings’ 6651 5586
   Small old quarry with possible old mine entrance. Loose block of very hard grey limestone, weathering yellowish, about 60cm thick. Possible Hurlet.
   On track beside old quarry there are two big rough boulders of massive hard quartzitic grit. From where? These are carved with masons marks including spiral,arrow, hourglass, and ‘pictish’ horizontal crescent with superimposed V. Clearly not recent, but certainly not Pictish, possibly a two centuries old estate feature.

2. Exposure 6660 5576
   Heaps of blue grey loose shale from old workings? and possible in situ block.

3. Old Abutments
   Low level path now virtually gone and badly obstructed with fallen trees. Old crumbling masonry abutement on either side of small side burn, about 6m above Rotten Calder which is just below. Loose black SHALE in banks. Upstream the burn cascades over fallen blocks.

4. Waterfall and Tufa
   Further upstream from the abutment, very steeply sloping, there is a double waterfall over sandstone beds. The top is near the top of the Calder gorge and near location 2. SANDSTONE yellow weathering hard medium to thick bedded with cross bedding 6m thick. Dip about 10^0 easterly into slope. Lower fall is covered in thick deposit of mossy TUFA about 3m high, and tufa cemented rubble.

5. Hurlet Exposure
   Just above the confluence of the side burn and the Rotten Calder, there is an exposure of LIMESTONE, about 70cm hard grey limestone with Ostracods. This is the Hurlet Limestone. Black mudstone above and below the limestone.

<u>13.5.2019 Mine Workings east of Newhousemill Bridge</u>

1. Laighlyock Farm mine shaft 6578 5365
   Torrance Pit 4m diameter depression about 1m deep surrounded by Coal Authority fence and signs. Records show 13.5 fathoms, surface level 5745, to HOUSE COAL 16 – 18inches thick, short wall workings brushed to 18 – 24 inches above in blaes with ironstone bands. Foundations of farm buildings nearby.

2. Structure 6571 5376
   Old broken masonry and brick structure “capped” with loose sheeting and boards. Rectangular 3.5m x1.5m. Top of main valley side. Possibly mine related but could be old farm septic tank?

3. Mine Mouth 6573 5378
   Torrance Colliery adit entrance at base of 3m cliff of SANDSTONE, medium to thick bedded with siltstone bands. Adit entrance fenced off, up to 2.5m wide and 1.5m high. Very jagged unstable entrance due to rock falls. Adjacent coal burn slopes steeply down to Calder with waterfall over sub horizontal strata.

<u>12.6.2019 Calder East Bank upstream from Rotten Burn confluence</u>

1. Cave and Cliffs 6568 5209 South end of cliff 6563 5202
   Just upstream of Rotten Burn confluence, extensive sandstone cliff with CAVE about 4m maximum length and 2m maximum width and 1.8m maximum height, formed in very blocky sandstone.

2. Mine Entrance 6568 5208
   At base of sandstone cliff just south of cave. Maximum 3m wide and 1m high, partly infilled. SANDSTONE cliff about 6 to 7m high, up to 10m in places, thick bedded and showing cross bedding. Also 0.5m mudstone at base with 0.1m of IRONSTONE, very hard fine grained grey. Were they mining this?

3. Ferruginous Issue 6557 5203
   Conspicuous reddish orange iron ochre issue about 1.5m wide and 3.0m long, soft ochre deposits up to 0.5m thick. Surroundings rather “humpy bumpy”, mining related?

4. Lower Flatt Linn 6551 5199 to 6548 5199
   Small falls and rapids across Calder totalling about 3m in height. SANDSTONE, medium brown medium bedded, dips nearly horizontal.

5. Exposure 6554 5199
   Small burn enters Calder at base of falls, exposing thin to moderately bedded SANDSTONES.